Example #8: A loop of 20 turns is 5 cm x 25 cm in area, and is turned one-quarter turn from the starting position to the end position (as in the diagram on the previous page) in 0.30 seconds in a magnetic field B of 0.50 T.

a) What average EMF was induced?

b) What will the EMF be for the <u>next</u> 1/4 turn?

a) $\Delta\phi = \Delta AB = -(.05 \times .25)(.50)$

$= -6.25 \times 10^{-3}$ Wb.

$N = 20$

$t = 0.30$ s.

$$\mathcal{E} = -20\,\frac{(-6.25 \times 10^{-3})}{0.30}$$

$$\boxed{\mathcal{E} = 0.42 \text{ V}}$$

b) here, ϕ increases from 0 to 6.25×10^{-3} Wb

→ since all other values are unchanged,

$$\boxed{\mathcal{E} = -0.42 \text{ V}}$$